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Industrial Exhibitions: Their True Function in
Connection with Industrial Education.

AN ADDRESS

DELIVERED BEFORE THE

Massachusetts Charitable Mechanic Association,

AT ITS

TWENTY-FIFTH TRIENNIAL FESTIVAL,

IN THE

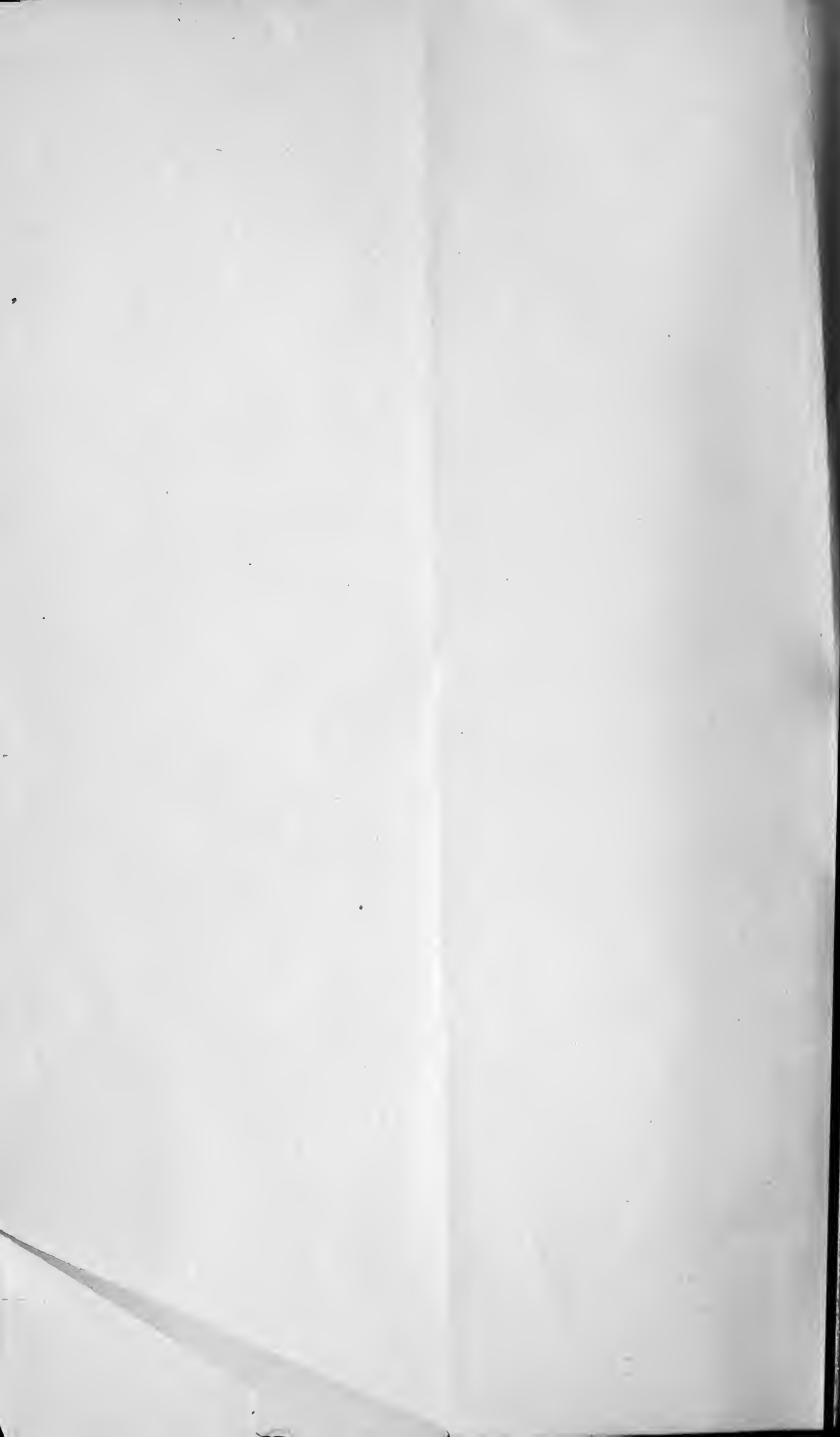
MECHANICS' BUILDING; HUNTINGTON AVENUE, BOSTON,

NOVEMBER 22, 1881.



BY EDWARD ATKINSON.

BOSTON:
WRIGHT & POTTER PRINTING CO.,
18 POST OFFICE SQUARE.
1882.



G. W. B. 2/6/13

INVITATION AND ACCEPTANCE.

SPECIAL ASSOCIATION MEETING, }
BOSTON, Dec. 21, 1881. }

On motion of ANDREW M. MCPHAIL, it was unanimously

Voted, That the thanks of the Association be presented to Edward Atkinson, Esq., for his interesting and instructive address on the occasion of the celebration of the Twenty-Fifth Triennial Festival of the Association, November 22 last, and that he be invited to furnish a copy of the same for the press.

BOSTON, Dec. 23, 1881.

JOSEPH L. BATES, Esq., *Secretary*:—

DEAR SIR:—I have received your note of the 23d, with the pleasant information regarding the vote passed by the Association. I enclose a copy of my address for publication.

Sincerely yours,

EDW'D ATKINSON.

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ADDRESS.

MR. PRESIDENT, LADIES AND GENTLEMEN : —

It is a great honor and pleasure to me to have been chosen to speak to you this evening. The rule of our Association is, I believe, that whoever gives the triennial address must be a member. Now membership in this Association implies that the person must be either a mechanic or an object of charity ; I am not a mechanic according to the customary use of that word, and I hope I am not yet an object of charity. How then shall I justify you in having admitted me? My life has been identified with the spinning and weaving of cotton cloth ; that would constitute me in common speech a *manufacturer*, and would relegate me to the company at the other end of the avenue ; but much as I honor the living and the dead to whom that great enterprise owes its existence I yet prefer your company.

“ The Lord do so to me, and more also,
If aught but death part you and me.”
And by you will I be buried.

But where, then, is your justification? If I am neither mechanic nor, as yet, an object of charity, what business have I to be a member of this Association? I will assert and prove my rights.

I am the Association. Unless you can find another man in your number like myself — who never did anything with his own hands in his life, except to drive a pen — who can neither make a joint nor lay a brick, neither forge nor weld, neither stitch a seam nor set a type — then I only am the Association, and all the rest of you have no business here. Why? Because you are nothing but *manufacturers*, and I am the only *mechanic* in the hall. You can *facture*, or make something with the *manus*, or hand, I can only set mechanism in operation, and by means of machinery work out results in which I have no practical share myself.

I can only work under the rule which underlies much of our modern work: "Never to do anything myself which I can get any one else to do for me." You, on the other hand, can exercise your own choice; if work for the head fails to be found you can apply your own hands, and you are then safe from want.

Of how many of our boys and girls can this be said? Is it not time to ask this question: How many of your own children can do the work which you have done so well?

What does it mean to do something with the hand and do it well? It means that brain, hand and eye have all been well trained together; it means that the whole man has been developed and not one part of him only; such a man can take a wholesome pride in his work, it is part of himself; no mechanism can ever rival the true work of the human hand, or give the full satisfaction of work well done.

Then to you, the real hand-workers — the crafts-

men — the true *manufacturers*, be the honors, if honor there is in a name, and let us who can only set mechanism in motion — who can do only mere machine work — take the lower places and defer to you. Only thus, gentlemen, can I justify my membership of this Association as a *mechanic*, and humbly ask you, my superiors, the true *manufacturers*, to listen to a few thoughts which seem to me well fitted to this occasion.

The real truth is we are all mechanics and we are all manufacturers — the words have lost their original meaning and now signify only two phases of the same work ; — they ought not to be parted, and I trust they never will be again in Boston, even by the length of Huntington Avenue.

My field of thought is very limited, and I must appeal again to the only art of which I know even a little, though I have worn the thread bare on other occasions. The finest work ever done, or that can now be done in the world in the fabrication of cotton cloth is still performed by the hand in India in the making of the Dacca muslins which have been named "Woven Wind." It is an hereditary art, and is still conducted as it may have been before iron had been smelted and before any tool of modern kind had become known among men. The cotton plucked with the finger is cleaned and separated from the seed by the snapping of a bow made of bamboo and strung with the gut of an animal; it is carded with a fish bone; twisted by the use of a stone distaff and the human finger — the ends of the warp are fastened in a simple loom made of reeds, while the weaver, seated

upon the margin of a hole dug in the ground, works only during the damp hours of the morning and of the evening. That is the true picture of a real textile manufacturer. All our modern textile machinery is but an evolution from, or modification of these pre-historic types.

On not one of our seemingly perfect modern machines can the work be equalled of those who have inherited this art and whose lissome fingers bear evidence of many centuries of training.

And as it is in this, so is it in many other branches of the finest work — the most perfect silk weaving is done upon a hand loom of simplest construction — but hand work is now a luxury where it is not a necessity.

The true benefit of modern mechanism consists in the quantity of useful work which it enables the workman to perform of sufficiently good quality to meet the increasing wants of a more and more dense population. Were it not for the rapid conversion of the products of the soil and of the mine, and the abundance which has ensued from the application of modern machinery to the arts, the abhorrent dogma of Malthus would ere this have been proved true, and even what are called civilized nations would have been swept away, not only by war, but by famine and pestilence, caused by scarcity.

Turn your attention for a moment to modern Italy. The great power of Rome was based not only or mainly upon force or skill in the arts of war. Agriculture was developed in marked degree; underdrain-
ing was practised; the modern reaper finds its arche-

type among the implements of the Roman Republic; the *silo* and the practice of *ensilage*, of which we now hear so much, and which may change all the conditions of New England agriculture, are fully described by Tacitus; the great aqueducts and means of irrigation and drainage, which are so marvellous in their very ruin, saved great areas from the pestilence which now scathes them; stock breeding was well understood, and the turnip culture, which has worked such vast benefit in Great Britain, was practised in Gaul and Brittany in the time of the Cæsars.*

But slavery sapped the foundation of this great industrial system — labor became ignoble — the mechanic was not honored — even the free barbarians of the Teutonic race who overwhelmed the great empire, themselves succumbed to the enervating luxury of slavery and war, until now modern Italy, so long held in the bonds of ignorance and superstition, presents the only example of a country called civilized, in which whole districts are devastated by a loathsome disease known as the *pellagra*, which is caused mainly by the want of sufficient and wholesome food.

It will have a strange sound to you when I speak of districts within our own country in which conditions analogous to these, although not as bad, may even now be studied by any one who is interested in economic science.

I will not speak of those strange and almost hopeless people, the clay-eaters and snuff-dippers of the

* See article on the "Agriculture of the Romans," by Prof. McBryde, of the University of Tennessee, in the Journal of the American Agricultural Association.

lowlands of some of the Southern States, but take you at once to one of the most beautiful and salubrious sections of our country, among mountains, of which Dr. Asa Gray says that one — Roan Mountain, in North Carolina — is the most beautiful mountain on this continent.

Within a radius of 150 miles from Mount Mitchell, a still higher mountain in this section, that is to say, within a circle of a diameter of 300 miles, rise the streams which are the sources of rivers flowing north into the Ohio, west into the Mississippi, south into the Gulf of Mexico, and east into the Atlantic ocean. I now quote from Colonel Killebrew, of Tennessee, who is in charge of the magnificent collection of timber, minerals and products of agriculture from this section in the Atlanta Exposition: "We have within this circle every mineral that animates industry; every kind of timber needed in the arts; 160 varieties are in this collection, six families or groups of iron ore, every kind of coal, winters never so cold as to interfere with out-door work, summers never so warm as to interfere with industry, great plateaus on which no case of consumption ever originated, valleys in which a light shower falls almost every day and in which the growth of grass is three-fold that of the famous blue grass section of Kentucky. What we need are moderate capital and skilled mechanics; the latter even more than the former, because they will speedily convert our vast resources into abundant capital; but bear in mind, Mr. Atkinson," said Colonel Killebrew, "when you carry this word to the North, tell them

there are two classes of people whom we will never tolerate in our land." "What classes are those?" said I, in some trepidation. The answer came as promptly and as sharply as the crack of a rifle, "*Mormons and Secessionists.*"

I can only give you one example of the industrial condition of the great district whose area stretches far beyond the 300 miles diameter described by Colonel Killebrew.

There are still within the great mountain section of our own land—within less than two days' journey from this very spot—from one to three hundred thousand people of our own blood and lineage, who are chiefly clothed in homespun fabrics. Bear in mind in this connection that by far the largest portion of the population of the whole globe is still scantily clothed in hand-made fabrics of cotton or of wool. Keep also in view the fact that in occupations to which modern machinery is applied, the lowest cost of production is compassed by those who earn the highest wages, because the measure of their earnings is in precise ratio to their skill and industry. Keep this principle and these facts in mind and you will then have a dim perception of the opportunity which commerce has yet to offer to the mechanic and the manufacturer of New England, provided the world can yield us hand-made or natural products which we will buy, and take in exchange the products of our machinery. Thus we may get ten or a hundred days' labor in exchange for one to five days of our own work.

Why has it happened that even a small part of our

own people are dependent on hand-work? Is the land where they live sterile? Is the climate bad? Are the conditions of life adverse to progress? Can they not make everything that we want? The very reverse, as I have told you, is true. There is no richer land on this continent than that of some of these interior mountain valleys. There is no better climate than that of some of these high plateaus. There is nowhere else in all our broad land such potentiality in mineral, timber and products of the soil combined in one place, or so much power to produce.

What, then, has retarded the progress of this people? Slavery only. It never indeed penetrated the mountain land in any great measure, but it surrounded this great "Land of the Sky," as it has been so well named, and kept its people from commerce with the world.

It is a strange sight, which may never again be seen in this country, but which is now present. In the grand central building of the Atlanta Exhibition, within the same rail which encloses the beautiful machinery of the Willimantic Linen Company, alongside a modern ring spinning frame working upon No. 100 yarn, are two spinning wheels and a hand loom of prehistoric type, yet operated now by women who have been trained to the work from early childhood.

Let me here interpolate an account of a little incident which brings into bold relief the capacity of modern mechanism. You have all heard of the two suits of clothes made in a day for two of the Governors. The full dress suit which I now wear was made in less than twelve hours from cotton standing in the field in the

early morning. The cotton gathered thus early was passed through a cotton gin before 8 o'clock, it was then carried through the cards and spinning frames of the Willimantic Linen Company, woven under the supervision of their representative upon a Crompton loom, dyed in the works of Mr. Thomas upon the grounds, cut by the skilful hands of Mr. Gosse, of Atlanta, and made up on the sewing machines of the Wheeler & Wilson Company, which latter machines also gave to the visitors in the exhibition another example of the best New England skill. The suit was sent to me at 6½ P.M. at Mr. Kimball's house, and arrayed in it, I made a call on Colonel Barrows, of the Willimantic Company at the neighboring house, by whom the suit was presented to me. The suit is lined with the silk made by the Cheney Brothers.

I have spoken of the Director General, my excellent host during my stay in Atlanta. The record of the exhibition is identified with his name; it was a little matter to state its need and give the reasons for it, and it would have sufficed but little to instruct a draughtsman how to make the plans, but even the zeal and good will of the progressive citizens of Atlanta would have failed had not the execution of the plans been in the charge of a man of such indomitable energy and executive power as H. I. Kimball, and to him is due the full meed of credit for what has been done.

Our friends in the South are ambitious to undertake the spinning and weaving of cotton fabrics, but I have urged them to be cautious—they have a hundred opportunities in which we cannot share—for the more profit-

able use of capital and labor. It startled them when I told them on what a small fraction the profit or loss of this branch of industry depended, and said to them they must first learn the difference between a nickel and a cent, and when I further added that we had in Massachusetts about seventy-five million dollars of capital in our cotton manufacturing, something over one hundred million in our railroads, but that the deposits in our savings banks were two hundred and twenty-five million, I fear they hardly believed me. But I added that the latter sum, belonging mostly to our working people, was just the measure of the difference between a cent and a nickel, and I have reason to believe that the outcome of the last remark will be the establishment of a Penny Savings Bank under the supervision of Mr. Sidney Root, a thoroughly competent and able man, who is the best friend of both the colored and the white laborers, and the chief promoter of the Abyssinian Library for colored men, for which he will be most glad to receive contributions of books.

But let us return to the main subject. These women who work upon the homespun fabrics may have come from one of the interior counties of that beautiful Southern mountain land where many of the inhabitants have never yet seen a wheeled vehicle—where English customs of the seventeenth century still survive, and where even the speech of the people marks their isolation. When I referred to one of her companions as *Mrs. Hoffman*, the gentle young woman who was so gracefully operating one of the spinning wheels corrected me, saying, "*Mistress Hoffman*, if you please!"

I obtained from the young woman data which I had long sought, by which I might measure the saving of human labor which has ensued from the application of the invention and skill of Arkwright and Cunningham, who made the modern cotton mill possible only a century since, and of their successors down to Mason, Knowles and Crompton, living representatives of the great mechanics of our own time and our own country.

In this homespun work two carders, two spinners and one weaver, working continuously and arduously for ten hours per day, can make eight yards of coarse cotton fabrics. In the factory one spinner and two weavers, with one hand on preparation and carding, can make more than eight hundred yards—more than one hundred fold.

It seems almost magical to see one of these women carding cotton on hand cards and bringing out the rolls ready for the spinners even while you are wondering what she is about to do; yet less than a century since, when President Washington visited the Town of Boston, he found one ninth part of its population, 2,000 out of 18,000 in number, engaged in making hand cards for the use of our own grandmothers, whose homespun fabrics then constituted the main portion of the material for clothing New England. It is a singular fact that in a seven days' journey nearly every mechanic in this hall can study the progress of a century or more in the history of his own art. The way-side charcoal iron furnace, the primitive methods of making pottery, the little still which yields altogether too much moonshine whiskey, the house built of hewn

logs, and every article of furniture, including the loom and the spinning wheel, all worked out by hand; all the arduous conditions of our own State of more than a century ago are there now; but fortunately for those who dwell there, and for us also, the school-house has come with liberty, and the railroad so penetrating everywhere—not only among the mountains but upon the plains. This whole Southern land is now being torn in pieces and reconstructed morally and industrially, in such a way that we may regard the political froth which obscures the deep undercurrent, as a mere scum which the wholesome fermentation is discharging from the stream in order that it may be carried down into the great gulf to be heard of no more.

What then are the functions of the exhibitions like our own; like the late exhibition of the Manufacturers and Mechanics' Institute, and like the yet more important one, in view of circumstances and conditions surrounding it, which is now in progress at Atlanta, Georgia? In the treatment of this subject I shall be very frank and shall submit my views in order to stimulate a wholesome discussion of the matter—they are my own, and are submitted without consultation with any one.

Exhibitions are useful in the precise ratio in which they serve the purpose of object lessons in industrial training. So far as they serve the purpose of merely advertising the products which represent the accomplished results of past inventions, they may be expedient and profitable, but they are of little significance for any other purpose. The mere money receipts from

visitors are the poorest measure of success, except so far as they affect the interest of their promoters.

The great exhibition at Atlanta would have been an immense success even if the first fear of lack of adequate receipts from visitors had not been surmounted.

The contrast between that exhibition and the two just ended here is very marked. The merchants and tradesmen of Atlanta have made almost no use of it to advertise their wares—it is almost absolutely free from trash, and it is also almost entirely American in the character of its exhibits. The examples of science and of machinery already applied to the useful arts are less in number than they were here, but to the majority of the people who see them they are of the greatest novelty and of the utmost interest.

On the other hand, the exhibit of crude and unused forces, now waiting for the application of science and art, exceeds anything ever seen before in this country, with the possible exception of the Centennial; and so far as the South is concerned, immeasurably exceeding that.

Everything has a point, and will lead not only to the extended use of tools, implements and processes already invented, but to the invention or completion of inventions not yet introduced at all. Time will not suffice, and this is not the place, for me to describe the absolute revolution in the cultivation and treatment of cotton which is sure to come from this beginning; neither can I here give the facts about the crops of the small farmers, who will soon become the controlling factors in Southern agriculture. What we have now

to consider is the true function of industrial exhibitions; and here I beg to say that I think the day of "World's Fairs" has nearly if not wholly gone by. They have been useful in their day, and have doubtless given a great stimulus to industry and art, but they now seem to me the most cumbrous, costly and confusing methods of accomplishing results which could be devised.

Let me not, however, undervalue such exhibitions. It is doubtless very useful to set great masses of people in motion, to get them out of their ruts, and to bring the citizens of different States and Territories together. One of the very greatest benefits of the Atlanta Exposition will be found in such an influence, and from the reduction in the excessive rates of passenger traffic, which has heretofore been the rule on Southern railroads, to a uniform excursion rate of one cent a mile. The lesson of larger profit from the lower rate may perhaps be learned, and the isolation and inertia of the Southern agriculturist may be broken up.

It may also be a great immediate benefit to a city to carry out one of the purposes which I understand to have been among the lesser aims of the promoters of the Manufacturers and Mechanics' Institute, to wit: To constitute the exhibition a great fair for the sale of goods, and thus to regain and retain branches of traffic which ought to be kept in Boston.

Great fairs, either under the name of World's Fairs, or under less ambitious titles may serve these purposes, but my purpose is to treat of exhibitions as means of education — as object lessons in industrial science.

Such were the grand and final purposes of our lamented friend, the late E. R. Mudge, and if we may venture to refer in any way to the motives of his chief associate, and may judge of them by the liberality and discretion with which he has sustained other institutions for industrial and technical education, such may still be the purpose of one whom we all honor but may perhaps not name aloud, although his name is in our minds. Such also I believe to be the purpose of every man in this old association.

What, then, should be our future course in respect to the use of our building and our future triennial exhibition? We have reason to congratulate ourselves upon our commercial success. No one, I suppose, now questions the wisdom of the purchase of this lot of land or of the construction of this building. Some of us may regret that there had not been even greater faith, and that the solid construction which marks a part of our work had not been carried out in the upper sections and in the roof, even though it had cost more. We all rejoice in the ample receipts by which our treasury has been replenished, and our means of accomplishing the charitable purposes of the association have been furnished. But we must not rest contented: if we do, our friends at the other end of the avenue may yet be justified, if they have ever intimated that our objects were not as broad and as beneficent as their own.

Let us then emulate and not compete; let us bring about that hearty co-operation by which the two structures may both be put to their best use, and may be

proved to be none too large for the useful work which may be done in them.

Most of us are, I believe, what are called "self-made men," although I never use that term without recalling the funny outburst of my late friend, Dr. Francis Lieber, when I used it in his presence. "*Self-made men*, indeed!" said he; "why don't you tell me of a *self-laid egg*?"

What we mean is that many of us never went to a good school in our lives, and never had the advantage of either technical or college education. Our instruction has been only that of the bench, the shop or the counting room. A course of instruction which is very apt to make men dogmatic and obstinate — what little they have learned by the somewhat painful method of experience they know so well and are so sure of that they undervalue all other instruction without the least consciousness of their own limitations. On the other hand, the graduates of our schools and colleges are apt to be so well booked in the theory of science and of the arts as to be entirely unaware of the necessity of practice and of experience, so that when they come to face the actual problems of real work, they are about as helpless as if they had never been instructed at all.

The two classes remind me of John Smith and Jim Brown, who ascended Mt. Washington together before the railway was built. John went on horseback and Jim went afoot. The next day they recorded their experience among the verses in Crawford's album as follows: "John couldn't sit down any better than Jim

could stand up." That is about the way of it when practice and theory are separated.

May we not then consider some of the objects which our Association may promote, either by itself or in co-operation with our friends?

First. There is no charity so beneficent as that which is extended to those who can help themselves, if the opportunity is only offered them.

How many men we have all of us known whose brains were so filled with inventive and constructive ideas that they could find no time to earn their own living; they are the theorists, except for whose work we practical men would be deprived of more than half our power of work.

How many men have we all known whose inventions have been kept back because they themselves had no control over the mechanical appliances needed to perfect them, and who have at last been forced to sell their brains for a single mess of pottage to some acute business man who makes a great fortune out of their ideas, while they remain as poor as ever.

I therefore suggest that one department of our light and useful basement be set aside as the "Inventors' Laboratory;" that it be furnished with adequate tools, appliances and power, and be kept for the use of all persons who may be approved by a permanent committee of our association; in which laboratory they may perfect or improve their inventions, and may be enabled to avail themselves of all the appliances and practical advice necessary for their work.

Second. Nothing is more needed at present than

an "Industrial Museum." We feel the constant need in the work of the Institute of Technology. We need technical collections of building materials—of textile fabrics, of chemical products, of ores and of timber. I could to-day obtain for the asking duplicates of every specimen in that superb collection of ores, timber and products of agriculture on exhibition at Atlanta, if we had a place to put them. The railroad corporations interested in developing their respective sections would jump at the chance to place the duplicate collection here. The Commissioner of Agriculture has already claimed the originals for removal to Washington.

Third. We have, in part by the aid of this Association, established a School of Practical Instruction in the Mechanic Arts, in connection with the Institute of Technology, it is insufficient in space and in appliances. If it could be transferred to one of these two buildings and in some way incorporated with the system of instruction of the Boston High and Latin School, it would serve as the normal school in mechanics which is becoming an absolute necessity, if we are to keep the lead in competition with other sections of our country more richly endowed with resources than we are.

None of these purposes would interfere with the rent or use of our hall or of other portions of our building. Our Lowell School of Industrial Design at the institute is crowded into narrow quarters far away in the attic of our building. Cannot this Association spare us one of those beautiful picture galleries for the free school of industrial design, which cannot now graduate its pupils fast enough to meet the demand.

Must we continue to send our sons to Europe in order that we may find a weaving school in which they can master the art of the loom?

Fourth. There is nothing inconsistent with our objects and aims in the purpose of the Manufacturers and Mechanics' Institute to hold a great annual fair for the exhibition and sale of goods in their building; rather let us co-operate with them, and during the period of their fair aid them in attracting customers and help our own finances by a continuous musical festival in our hall, and perhaps by an exhibition and sale of all kinds of works of art in our galleries.

Fifth. Let us invite them to coöperate in our triennial exhibition. Both of our exhibitions of this year were imperfect and unsystematic. It is not necessary to discuss the reasons — the faults were, under all the circumstances, unavoidable, but this ought not to happen again.

I venture to suggest that the committee on the next triennial exhibition should be appointed at once, with instructions to invite the appointment of similar committees on the part of the Manufacturers and Mechanics' Institute, of the Massachusetts Institute of Technology, of the American Association for the Advancement of Science, of the Museum of Fine Arts, and of the Boston Society of Natural History.

It may then happen that such a joint committee would assign the building of the Manufacturers' Institute to the display of perfected machinery and products, and our building to a systematic exhibit of the processes of industry and invention, of new materials

and problems in the arts, with such other examples as would show the progress made in the period which will elapse between the present date and the time of our next exhibition.

Would it not be well to consider what science and art have *not* yet accomplished?

Our waste of fuel is awful—the best results yet obtained in a stationary engine are, I believe, less than eleven per cent. of the absolute value of the coal—in the locomotive about three per cent.

The true pavement can only be seen in Western Kentucky, where the ferruginous gravel hardens under wear into a natural concrete and excels any artificial pavement yet invented.

The true material for covering roofs remains to be discovered or perfected.

We are saved the smoke nuisance only by the accident of our position.

We have no incombustible varnish with which to retard the action of heat upon wood so as to give us a little more time to put out a fire.

The doctors cannot tell us how to avoid obesity, and hardly know what the germ of some diseases is.

Good acoustic properties are the accident of architecture rather than the result of science, unless our Mr. Preston has solved the secret and really planned the admirable properties of this hall.

Whoever improves on Arkwright and finds a true substitute for the leather cover of the top rolls of our spinning frames will add five or ten per cent. to the capacity of every spindle in the world.

The baneful electricity developed in all our textile factories waits to be put to use.

The potato bug is too much for us, and the cotton worm not only cuts off a large part of every crop but fills the rest with the pernicious bits of leaf, when he bites off more than he can chew.

Our domestic furnaces desiccate the atmosphere of our houses and give us all the catarrh.

The best loom in use makes a dreadful clatter and will sometimes almost shake a mill to pieces, unless its vibrations are set to a different beat on a portion of the number.

Who can pretend to have solved the problem of disposing of sewage and keeping our water pure and sweet?

May we not well indict the scientists and inventors for their incapacity to meet our simplest needs; and while doing so may we not offer the only service which we practical men can render them, that is, give them the place for their feet, the tools for their hands and the shelter for their heads in our permanent building?

Gentlemen: five millions of dollars are asked merely in order that we may prepare to hold a World's Fair in Boston — let but the hundredth part of this sum be devoted to organizing the work which I have imperfectly laid out, and to extending the methods which I have sketched thus faintly, and I venture to predict that greater progress in industry and art would ensue than could be brought about by any great World's Fair in the present decade or any other; and a tenth part of

the five millions would richly endow the new work for all time to come.

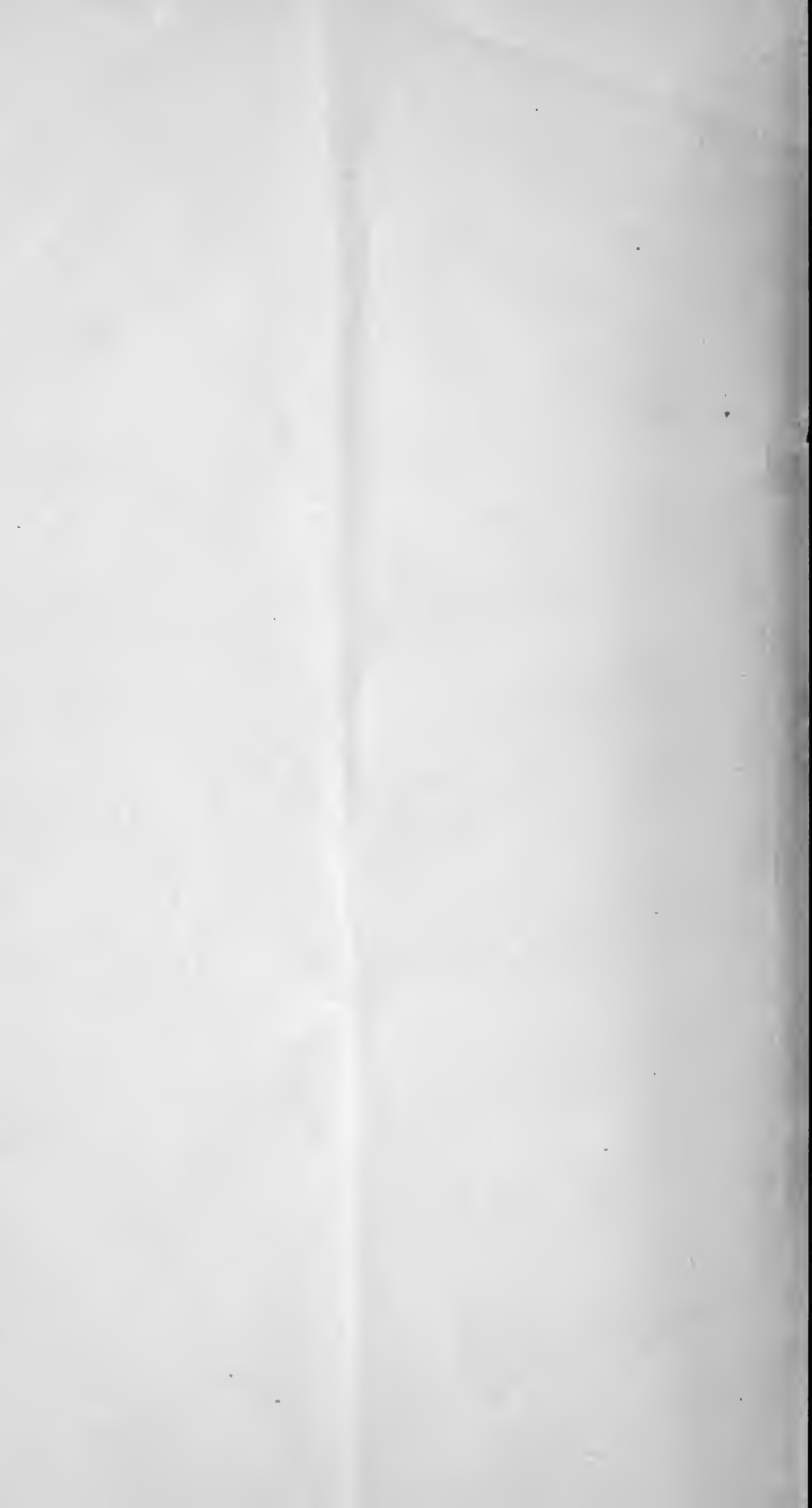
We have no choice in this matter ; our only advantage over our neighbors is what has been so well called "the healthy stimulus of prospective want," the sharp bite of our east wind and of our winter snows, all of which keep us from being as lazy as our neighbors may dare to be. We have in Massachusetts the most adequate railway service in proportion to our area of any State in the world — one linear mile to each four square miles of surface. It will take 120,000 miles more railroad to bring the rest of the country up to one-fourth of our standard. Here is work for mechanics — continuous, sure and steady. In the sixteen years that have elapsed since the end of the war we have constructed 66,000 miles out of the 100,000 by which this country is now served — a little more than 4,000 miles in each year. Is it too much to expect to construct an average of 6,000 miles, in each year of the next sixteen, and thus double our present service? We are building more than that this year, but we may be going too fast. What force will this require? Three hundred and fifty thousand men — more in number than all our factory operations combined. Can we spare this work?

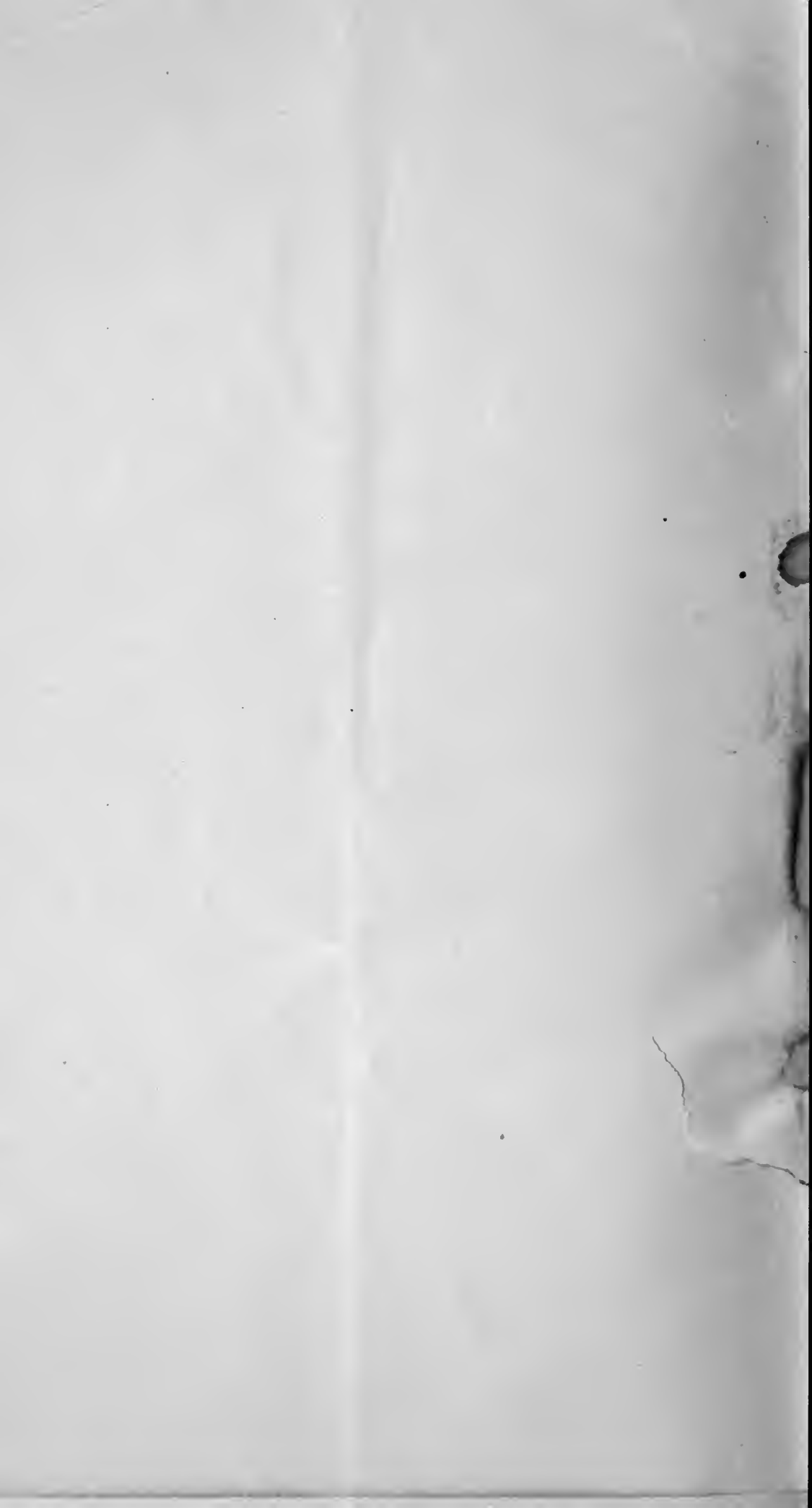
In Atlanta I called upon our Southern brethren to thank God that the Potomac had *not* become the Rhine of this Continent, and that two jealous and hostile nations were *not* watching each other over the ramparts on their frontiers. Well and heartily did they respond. I gave them this railway problem, in which

they have most at stake, calling upon them to note the startling fact that if we had been obliged to maintain standing armies in proportion to our population as it will be for the next sixteen years — in the same measure which the standing armies of France and Germany bear to this people, our force would number 700,000 men. Such would, perhaps, have been our need had secession been successful.

With half this number we can double our railway service, and with the productive work of the remainder we can bring the commerce of the world to our feet.

Such is the picture which I would spread before your mental vision. Ours is the grand work of destroying the vested wrongs of other nations, of making the blood-tax of standing armies impossible to be borne, of carrying peace, good will and plenty to all the nations of the world. In this great work the Captains of our industry are our master mechanics, our manufacturers and our farmers. Will you aid in dedicating our buildings to the work and make them the high schools of industrial education?





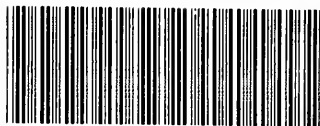
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